EARNED VALUE COST PERFORMANCE REPORT
DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.**

2. **ISSUE**: Draft

3. **DRD NO.**

4. **DATA TYPE**: 2

5. **DATE REVISED**:

6. **PAGE:**

7. **TITLE**: **Cost Performance Report (CPR)**

8. **DESCRIPTION/USE**: To provide information for: (1) integrating cost and schedule performance data with technical performance measures, (2) assessing the magnitude and impact of actual and potential problem areas causing significant cost and schedule variances, and (3) providing valid, timely project status information to higher management. The CPR is also a crucial element of NASA's Continuous Cost-Risk Management (CCRM) process (Step 9) providing the Project Manager high quality, timely cost-risk feedback for cost management improvement. (see page 6 for full explanation of CCRM).

9. **OPR**:

10. **DM**:

11. **DISTRIBUTION**: Per Contracting Officer's Letter

12. **INITIAL SUBMISSION**: Per Data Requirements Matrix

13. **SUBMISSION FREQUENCY**: Monthly. Per Data Requirements Matrix. The Cost Performance Report shall be available for online viewing at any time during the effort by the government using appropriately protected Internet/Intranet technologies.

14. **REMARKS**:

15. **INTERRELATIONSHIPS**: The *Financial Management Reports* (DRD# ???) shall include a reconciliation between the 533M/533Q and the Cost Performance Report, which shall be submitted as an attachment to the 533M/533Q reports. The CPR reporting levels and frequency shall be in accordance with the Contract *Work*

Breakdown Structure (DRD# ???) and contract provisions; Risk Management Plans and Reports; Probabilistic Risk Assessment Plan and Reports; risk identification and assessment in the Cost Analysis Data Requirement (CADRe). Technical Performance Measurement Plan and Report; Integrated Master Schedule and Critical Path Reports; Generally, link all risk-related DRDs to CPR DRD so that contractor is considering their interrelationships in all reports.

16.   **DATA PREPARATION INFORMATION**:

16.1   **SCOPE**: The Cost Performance Report (CPR) includes data to measure cost and schedule performance.

16.2   **APPLICABLE DOCUMENTS**:
DI-MGMT-81466   *Data Item Description for Cost Performance Report* (available at: http://www.acq.osd.mil/pm/newpolicy/cpr_cfsr/cpr_finl.html); *Cost Estimating Handbook* at: www.ceh.nasa.gov

16.3   **CONTENTS**: The Cost Performance Report shall include data pertaining to all authorized contract work, including both priced and unpriced effort, that has been authorized at a not-to-exceed amount in accordance with the Contracting Officer's direction. The CPR shall separate direct and indirect costs and identify elements of cost for all direct reporting elements. The CPR shall consist of:

a. Format 1, Work Breakdown Structure (WBS): Format 1 shall provide data to measure cost and schedule performance for each WBS elements, in accordance with the standard NASA product WBS as defined in Project WBS DRD #_____, and the hardware, software, and services NASA is buying. Critical/major subcontractor cost and schedule performance data are required when subcontract value is above threshold for EVM requirements and/or subcontract is marked for special attention, otherwise, summary level performance measurement data shall be included as an attachment to Format 1. Subcontractor Cost Performance Report (CPR) or Cost/Schedule Status Report (C/SSR) is acceptable. If risk items identified for specific reporting on prime are flowed down to subcontractors then those risk items require reporting as expected by prime regardless of cost of subcontract.

b. Format 2, Organizational Categories: Format 2 provides the same data as Format 1, sorted by the contractor organization at the level of organizations responsible for managing risks identified in paragraph 15.3.e below. If the contractor is organized by product, Format 2 should be organized by key performance parameters (KPP). For organizations not responsible for risks identified in paragraph 15.3.e, organizational category reporting shall be to the first level of the program's organizational structure.

c. Format 3, Baseline: Format 3 provides the budget baseline plan, at a minimum of WBS Level _____and total program, against which performance is measured. It is the baseline report used to track all changes to the Performance Measurement Baseline (PMB). Format 3 shall contain baseline manpower forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and the remainder of the contract for the last period (column 14).

d. Format 4, Staffing: Format 4 shall provide manpower staffing forecasts, at a minimum of WBS Level _____and total program, for correlation with the budget plan and cost estimates and contain the manpower baseline which will be updated and submitted whenever the Performance Measurement Baseline changes. Organizational category reporting shall be to the level responsible for managing risks identified in paragraph 15.3.e, otherwise, organizational category reporting shall be to the _____level of the program's organizational structure. Format 4 shall contain baseline and manpower forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and the remainder of the contract for the last period (column 14).

e. Format 5, Explanations and Problem Analyses: Format 5 shall be a narrative report used to explain significant cost and schedule variances and other identified contract problems. Performance measurement (BCWS, BCWP, ACWP on Formats 1 & 2) for high risk WBS elements in the following subsystems at the source levels of the risk (i.e., at WBS element or Control Account levels where appropriate) shall be provided every month regardless of percentage or dollar variance levels until such time as they do not represent a cost or schedule risk and the project office informs the contractor that reporting on these elements is no longer necessary:

(Insert list of medium- and high-risk WBS elements here)

The government reserves the right to amend the above list in the final RFP, at the appropriate time during source selection, at BAFO, and at any time during the effort as new information on risks becomes available.

If WBS elements, other than those identified from the above list, begin to experience variances exceeding 10% current period variances for two consecutive months, the contractor will inform the Project Manager and a consensus reached on adding them to the group of high risk WBS elements identified for monthly cost performance reporting and analysis purposes. All other WBS elements shall have earned value (BCWS, BCWP, ACWP) reported at level _____ of the WBS. Subcontractor variance analyses and a discussion of the prime contractor's analysis of the subcontractor's

performance shall be provided in Format 5. Any high-risk WBS elements above that are flowed down to subcontractors are subject to the same performance measurement requirements as the prime. In addition, the initial submission of the CPR (Format 5), the contractor shall rank, in descending order of criticality (i.e., the most critical elements will be at the top of the list and the least critical will be at the bottom), all reporting level WBS elements anticipated (as determined by the contractor project manager) to be schedule drivers, and all WBS elements (in a similar ranking) anticipated to be the cost drivers on the project. This list shall contain both the list of high-risk WBS elements provided by the Project Office above and any other contractor-specified schedule and cost drivers. The contractor shall submit an updated list of the rankings every six months, based on performance to date. The Government reserves the right to modify this ranking based on Government perception of criticality. The contractor shall use "critical path" and "risk-path" scheduling techniques; identification of the risk and critical paths by WBS element will meet the schedule drivers' requirement. Ranking of the critical and risk path cost drivers shall also be provided. These critical elements shall reconcile to the Master Schedule submitted to the Government.

f. Variance Analysis: The Variance Analysis shall be a narrative report addressing the following:

1. All medium- and high-risk WBS elements contained in the list identified above in para. 15.3. e;

2. Reporting elements that equate to 50% of the list of the schedule drivers (i.e., if 20 schedule drivers are listed, the 10 most critical schedule driver variances over $100k will be addressed). If there are 10 or fewer schedule driver variances, all variances over $100k shall be addressed.

3. Reporting elements that comprise the top 50% of the cost drivers (i.e., if 20 cost drivers are listed, the top 10 most critical cost driver variances over $100k). If there are 10 or less cost driver variances, all cost variances over $100k shall be addressed.

4. Impact to the contract Estimate-at-Complete (EAC) for all cost and schedule driver variances addressed.

5. Explanation for all variances at completion over $500k.

6. Corrective Action Plan, as applicable.

7. Identification of dependent or inter-related WBS elements that could be affected by high-risk WBS elements or Control Accounts identified for monthly reporting from list in paragraph 15.3.e above.
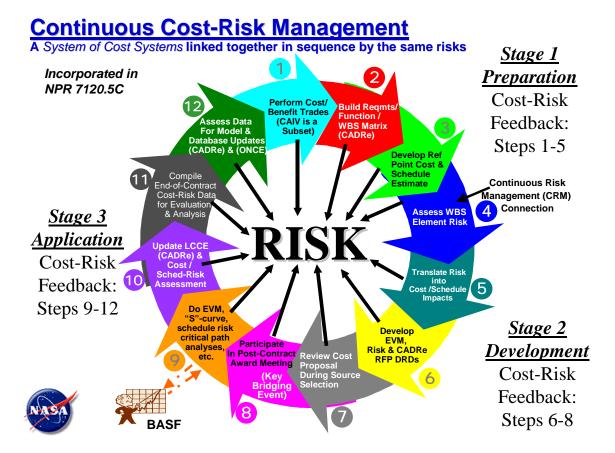
In accordance with the CADRe DRD, the contractor shall, at least annually, re-assess the cost-risk on the contract, developing a cumulative distribution function (CDF) that reflects the degree of cost-risk variance at the total contract level at that time. The contractor shall provide the resulting CDF and supporting data and rationale. The contractor shall identify the Interquartile range endpoints (that is, the 25th and 75th percentiles) as estimates in CPR Blocks 6 a and b for best and worst cases. Explanations of changes from previously reported best and worst cases shall be provided in Format 5 for program management documentation.

For program management and cost calibration purposes, the contractor shall classify all cost growth as either 'risk-driven cost & schedule growth' or 'externally-driven cost & schedule growth' in Format 5 as source information for the CADRe.

- ***'Risk-Driven Cost & Schedule Growth' (RDCG & RDSG)*** is that cost and schedule growth caused by overruns and funded or unfunded changes, linked to technical risk categories originally used to identify cost-risk in the cost estimate (e.g., technology, complexity, schedule, design/engineering, manufacturing, integration, etc) and key engineering performance parameters (e.g., dynamic load resistance, operating voltage, radiation resistance, emissivity, etc.).

- ***'Externally-Driven Cost & Schedule Growth' (EDCG & EDSG)*** is that cost and schedule growth caused by overruns and funded or unfunded changes, linked to external factors (e.g., requirements changes, technical enhancements not driven by risk, perturbations to budgets by external agents causing schedule changes, etc.) over which the contractor has little, if any, control. (NOTE: The EDCG & EDSG drivers shall be specifically identified in variance analysis reporting)

16.4   **FORMAT**: CPR formats shall be completed according to the instructions outlined in DI-MGMT-81466 and the following forms: Format 1 (DD Form 2734/1); Format 2 (DD Form 2734/2); Format 3 (DD Form 2734/3); Format 4 (DD Form 2734/4); and Format 5 (DD Form 2734/5). Images of the CPR forms are located at: http://www.acq.osd.mil/pm/newpolicy/cpr_cfsr/cpr_gif_new.html. Contractor format shall be substituted for CPR formats whenever they contain all the required data elements at the specified reporting levels in a form suitable for NASA management use. The CPR shall be submitted electronically using the

American National Standards Institute (ANSI) X12 standards (transaction sets 839 for cost) or any other equivalent or better electronic format. The X12 file is considered part of the CPR submission and due at same time as the data item report.

16.5   **<u>MAINTENANCE</u>**: Changes shall be incorporated by complete reissue.

Continuous Cost-Risk Management
A *System of Cost Systems* linked together in sequence by the same risks

Incorporated in NPR 7120.5C

Stage 1 Preparation
Cost-Risk Feedback: Steps 1-5

Stage 2 Development
Cost-Risk Feedback: Steps 6-8

Stage 3 Application
Cost-Risk Feedback: Steps 9-12

RISK

1. Perform Cost/ Benefit Trades (CAIV is a Subset)
2. Build Reqmts/ Function / WBS Matrix (CADRe)
3. Develop Ref Point Cost & Schedule Estimate
4. Assess WBS Element Risk — **Continuous Risk Management (CRM) Connection**
5. Translate Risk into Cost /Schedule Impacts
6. Develop EVM, Risk & CADRe RFP DRDs
7. Review Cost Proposal During Source Selection
8. Participate In Post-Contract Award Meeting (Key Bridging Event)
9. Do EVM, "S"-curve, schedule risk critical path analyses, etc.
10. Update LCCE (CADRe) & Cost / Sched-Risk Assessment
11. Compile End-of-Contract Cost-Risk Data for Evaluation & Analysis
12. Assess Data For Model & Database Updates (CADRe) & (ONCE)

BASF

NASA

In order to meet the space project cost challenges for the next decade and beyond, NASA cost management processes must evolve from traditional methods to modes that are truly transformational. The new focus for cost management at NASA will be Continuous Cost-Risk Management (CCRM). Additionally, the days of implementing cost management as a set of "stovepipe" activities are over. In reality, cost management is a series of related cost activities and involves three main Stages that are linked together through a shared set of project risks. Cost management, in effect, IS the management of cost-risk and can be characterized as continuous feedback on cost-risk. Feedback is essential to the transformation of cost management into a dynamic, continually reacting system where focused reporting of metrics on medium and high-risk drivers alert the project manager that a negative cost trend has been identified and requires action. The three Stages of Continuous Cost-Risk Management: *Preparing* for cost-risk feedback; *Developing* cost-risk feedback; and, *Applying* cost-risk feedback, occur at different points in time during an acquisition phase and involve the collaboration among cost estimators, project engineers, project managers, procurement analysts and Earned Value Management (EVM) specialists in managing the challenges presented by the risks. Cost management is NOT a grouping of unrelated stove-piped cost activities but is a "system of cost systems" based on viewing 12 cost activities normally treated as stovepipes as a continuum of activities interconnected through risk. This CCRM repeats in most acquisition phases.

The first Stage in Continuous Cost-Risk Management, *Preparing* for cost-risk feedback, involves NASA project teams performing three main activities: cost/performance trades (e.g., Cost as an Independent Variable (CAIV)); developing a definition of the program (e.g., part of the Cost Analysis Data Requirements (CADRe)) and, producing a range of possible costs (e.g., probability density function (PDF) and cumulative distribution function (CDF) or "S"-curve). CAIV trades flow out of a well-defined Concept of Operations (CONOPS) and demonstrate a commitment to evolutionary acquisition by being initiated in pre-Phase A for earliest implementation. These cost/performance trades are the first opportunity for representing the potential cost impacts due to risk. The CADRe will contain the definition of the project (analogous to the DoD Cost Analysis Requirements Description or CARD) for use by cost estimators where the traceability from Work Breakdown Structure (WBS) element, through functions, to initial requirements will be clearly identifiable. The cost range exemplified in a PDF and CDF involves developing a reference point cost estimate from a cost model (e.g., NAFCOM, PRICE, SEER, etc.), and incorporating cost model estimation, technical and correlation risk. Participants in the *Preparing* for cost-risk feedback Stage of the CCRM are mainly cost estimators, project engineers and project managers. This represents the starting point for cost-risk management. From this point forward the challenge will be in managing to the cost level chosen, no matter what cost-risk margin has been included.

The second Stage in Continuous Cost-Risk Management is *Developing* the feedback to manage the cost-risks. Since hardware contractors are selected to develop NASA systems, they must be informed about the potential cost-risk impacts identified by the NASA cost teams for their attention, monitoring, management, and reporting to the NASA project office. They must be informed in the Request for Proposal (RFP) Data Requests (DR) to produce multiple products that reflect the status and trends of these potential cost-risks. For example, as part of the CADRe, they will be required to produce a Life Cycle Cost Estimate (LCCE) for the proposal and LCCE updates at significant contract milestones (at least annually) as part of the contractual effort. The "S"-curve products of these requirements will enable the measurement of variance changes in the cost-risk distribution over time reflecting the management of risk and cost-risk. The CADRe will also require that initial key technical parameters, and changes to them over time, be documented along with actual costs associated with all WBS elements. These data will eventually populate the One NASA Cost Engineering (ONCE) database, keeping a record of project cost behavior for updating NASA cost models and available for cost analysis. Requirements to monitor, manage, and report monthly on the top medium and high-risk WBS elements identified during the *Preparing* Stage will be included. When required, a monthly earned value report will also be in the RFP, requiring performance measurement, variance analysis and corrective action reporting on all WBS elements, with a special focus on medium and high-risk WBS elements. These reports will require monthly Estimates at Completion (EAC) on all elements with a special focus on medium and high-risk WBS elements. Electronic access to these data will also be required. Other sources for monitoring and managing the top medium and high-risk WBS elements can come from Technical Performance Measure (TPM), Risk Management, Technical Interchange Meeting (TIM), Integrated Product Team (IPT) and

Probability Risk Assessment reports. Based in part on the way bidders address these RFP requirements in the cost proposals submitted, NASA will select a winning bidder and set up a post-award meeting with the selected contractor to verify the proposed cost-risk management methods. If EVM is required on the effort, the meeting at which this discussion takes place (along with baseline validation) is called an Integrated Baseline Review (IBR). Participants in *Developing* cost-risk feedback are the cost estimators, project engineers, project managers, procurement analysts and EVM specialists.

The third Stage in cost-risk management is *Applying* the cost-risk feedback for managing costs. If the first two Stages in cost-risk management, *Preparing* for cost-risk feedback and *Developing* cost-risk feedback, have been properly accomplished, the cost-risk feedback from the EVM (or similar) system, supported by TPM reports, Risk Management Reports, TIM minutes, IPT meeting minutes, etc., will give the project manager the highest quality information possible for managing those WBS elements most likely to drive cost growth. The focus for reporting, analysis and action will be on medium and high-risk WBS elements since they were identified for specific reporting in the RFP and addressed by the winning contractor in his proposal. If cost and schedule performance analysis indicates problems, a decision to reiterate a cost/performance trade (part of the *Preparing* for cost-risk feedback Stage above) may have to be made, for a possible adjustment to a system requirement. EVM performance analysis, focused on risk impacts to cost and schedule, will enable development of monthly EACs providing the project manager crucial feedback on the potential cost effects of the risks. This information provides the project manager with focused insight into the cost-risk in order to better manage his/her costs. CADRe-required updates to the initial LCCE estimate at significant milestones (at least annually) can be analyzed for changes (hopefully reductions) in "S"-curve variances, indicating progress in managing risks and cost-risks. At the end of the effort a volume of high-quality cost, risk, and cost-risk information will have been collected that can be added to the ONCE database for follow-on contractor performance analysis, cost-risk methodology calibration and updating cost models in order to better cost estimate future projects. Participants in *Applying* cost-risk feedback are primarily project engineers, project managers and EVM specialists with cost estimator involvement during cost/performance trades (if required), and updating "S"-curves, databases and cost models.